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EXAMINER

THOMAS, SHANE M

ART UNIT	PAPER NUMBER
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2186

DATE MAILED: 12/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/872,243

Applicant(s)

NGAI ET AL.

Examiner

Shane M Thomas

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 September 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 2-8, 10-27 and 54-102 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 27 is/are allowed.
- 6) ☒ Claim(s) 2-7, 10-16, 19-21, 25, 26, 54-57, 60-64, 67-71, 73-79, 82-84, 88, 89, 91-94 and 97-101 is/are rejected.
- 7) ☒ Claim(s) 8, 17, 18, 22-24, 27, 58, 59, 65, 72, 80, 81, 85-87, 90, 95, 96 and 102 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 May 2002 is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

DETAILED ACTION

This Office action is responsive to the amendment filed 9/16/2004. Claims 2-8, 10-27, and 54-102 are presented for examination; claims 1, 9, and 28-53 are canceled.

Claim Objections

Claims 2,12,13,66,75, and 76 are objected to because of the following informalities:

As per claim 2, the term --the circular buffer-- (line 13) should be amended to --a circular buffer-- since --*the* circular buffer-- has not been previously defined in the claim. Further, the term --the particular amount of storage-- should be amended to --a particular amount of storage-- since --*the* particular amount of storage-- has not been previously defined in the claim.

Claims 12,13,66,75, and 76 are objected to as being dependent on claim 2.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 2-7, 10-16, 19-21, 25, 26, 54-57, 60-64, 67-71, 73-79, 82-84, 88, 89, 91-94, and 97-101 are rejected under 35 U.S.C. 102(e) as being anticipated by Wahl et al. (U.S. Patent No. 6,324,654).

In order to make this Office action more coherent, the Examiner will follow the order of claim dependence of the independent claims instead of chronological claim order. Therefore, the rejection of claims 12 and 13 will follow the rejection of claim 2 since they are the next claims dependent upon on claim 2. Likewise, the rejection of claim 3 will follow the rejection of claim 54, since claim 3 is dependent upon claim 54.

As per claims 2 and 66, Wahl teaches in column 2, lines 44-65, that --undo-- information is being stored in a storage space (combination of local data devices 16 and writelog devices 18 of figure 1). The Examiner is considering the broad term of --changes-- to comprise discrepancies between a local data device 16 and the correct version of the local data device. For example, if a local computer system crashes, upon recovery, there is a --change-- or discrepancy between what data the local data device 16 contains and what data the device 16 *should* contain. Writelog 18 maintains updates to the device 16 that, once written to the device 16 upon recovery

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(column 3, line 66 - column 4, line 3) allows the local data device to --remove changes-- (remove the discrepancies) to guarantee the device 16 is current. Thus, the Examiner is considering the information stored in the writelogs 18 to be --undo-- information and the writelogs themselves to be --segments--. Wahl shows a plurality of entities (12 and 14) in figure 5 that cause updates to the local data device 16 (comprised in QDS devices 26 - see figure 3).

Monitoring usage of the storage space by the entities occurs via user defined throttles that run periodically and designed to deal with overflow and underflow conditions occurring to the writelog devices 18 (column 14, lines 34-50). Each entity is assigned a segment 18 [for each local data device 16] for storing undo information of the entity (14, 16) based on usage. If the usage dictates that an overflow condition is imminent, the segment 18 is allocated another segment or dynamically assigned more storage space (column 7, lines 47-59).

Writelog devices 18 are circular buffers (column 7, lines 4-5, and figure 2), and as taught in column 7, lines 47-67, the particular amount of storage space that is dedicated to the circular buffer (writelog 18) is automatically (dynamically) adjusted by adjusting the number of segments (another writelog devices 18 is chained to the primary system 12) or disk space is dynamically assigned to the writelog device about to overflow.

Further regarding claim 66, Wahl states that a device driver 22 (set of software instructions) manages the writelogs 18 and local data devices 16 (column 6, lines 53-65). The software program shown in figures 6-9 can be seen as setting throttles for the system of Wahl; these throttles periodically monitor the system of Wahl and perform actions as required. Refer to column 14, lines 34-67.

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As per claim 12, the Examiner is considering a --new entity-- to be a primary system (12, 14) that just comes back online. Further, if while recording updates in a writelog 18 of the new entity, the writelog is about to overflow, another segment 18 from the extension pool 18A (figure 1) can be checked to make sure it is not currently assigned to another entity for overflow purposes, and if not, can be allocated to the --new entity-- to aid in the overflow of the new entity's writelog 18. Note the Examiner is stating that since the writelog extension pool 18A comprises spare segments 18 that can be dynamically allocated and de-allocated (column 15, lines 1-11), it is inherent to the system of Wahl to have determined which spare segments 18 were allocated and which are not currently allocated to an entity (in extension pool 18A).

As per claim 13, the Examiner is considering the --first amount of storage space allocated to a first segment-- to be the entire amount of storage space allocated to a spare writelog 18. Therefore, the rejection of claim 13 follows the rejection for claim 12.

As per claims 75 and 76, the software program shown in figures 6-9 can be seen as setting throttles for the system of Wahl; these throttles periodically monitor the system of Wahl and perform actions as required. Refer to column 14, lines 34-67.

As per claim 4, the rejection for lines 1-10 follows the rejection for claim 1. Regarding lines 11-15, Wahl teaches in column 14, line 34 - column 15, line 12, that user-defined throttles monitor usage of the system of Wahl periodically (via the primary mirror daemon 24). Each time the daemon examines the throttles, the Examiner is considering it a --period of time--. Further, the Examiner is considering a first period of time to be when a writelog 18 does not have a pending overflow condition and a --second period of time-- when the writelog 18 does have a pending overflow condition. Thus if an overflow condition is eminent at the second time

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period, the throttle acts to automatically adjust the number of segments 18 dedicated to an entity by assigning an extension device from the writelog pool 18A.

As per claim 5, Wahl teaches that if usage (of a spare segment 18) has decreased a throttle can indicate to the daemon 24 that a segment can be deallocated (freed) from an entity, thereby shrinking the sum of the sizes of the plurality of [active] segments 18. Refer to column 15, lines 1-12.

As per claim 6, as taught in column 15, lines 1-12, when the sum of the sizes of the plurality of segments 18 “shrinks,” a segment 18 is deleted (freed) from the plurality of [active] segments currently assigned to the entities (12 14).

As per claim 7, a throttle is periodically (series of periods of time) by a daemon 24 to determine if usage has decreased (underflow) over a period of time. The Examiner is considering the --first amount of storage space allocated to a first segment-- to be the entire amount of storage space allocated to a spare writelog (segment) 18. Thus, as taught in column 15, lines 1-12, if an underflow conditions occurs (usage has decreased over a period of time), this indicates that the entity is no longer using a spare writelog 18 (segment) and can de-allocate (free) the writelog (and its first amount) from the entity to return to the extension pool 18A.

As per claim 21, monitoring usage, as taught by Wahl, comprises monitoring the overflow throttle of the writelogs 18 (column 14, line 34 - column 15, line 12) periodically by the daemon 24. Thus, it can be seen that since the daemon monitors the amount of active data stored in the writelog 18, the daemon is monitoring the amount of undo information that is stored in the writelog 18 after each period of time (that is designated in the throttle).

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As per claim 54, Wahl teaches storing undo information in a storage area (combination of local data devices 16 and writelogs 18 (figure 1). This storage area includes a plurality of segments 18, wherein each segments is used as a circular buffer (column 7, lines 4-5 and figure 2). Wahl further teaches automatically adjusting the size of the storage area based on the usage of the segments 18 by dynamically allocated additional storages space or chaining a spare segment 18 to a segment that is deemed to overflow. Undo information is being defined similarly as discussed in the rejection of claim 2.

As per claim 3, Wahl teaches in column 7, line 60 - column 8, line 2, that a maximum amount of storage space can be established (128 writelog devices in the extension pool). Further, it is inherent that the system of Wahl prevent a sum of sizes of the plurality of segments 18 from exceeding the maximum since the maximum is a physical limitation of the system.

As per claim 10, Wahl teaches a --first condition-- to be an indication by an overflow throttle that a segment 18 has a pending overflow condition (column 14, line 34 - column 15, line 12). If the first condition are satisfied, then a new segment 18 is formed (assigned to the entity from the extension pool 18A). It is inherent that the new segment not be allocated to any segment currently active since the segments 18 contained within the extension pool are defined by Wahl to be spare segments. Further, the Examiner is stating that since the writelog extension pool 18A comprises spare segments 18 that can be dynamically allocated and de-allocated (column 15, lines 1-11), it is inherent to the system of Wahl to have determined which spare segments 18 were allocated and which are not currently allocated to an entity (in extension pool 18A).

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As per claim 11, the rejection of lines 1-5 follow the rejection of claim 10, lines 1-5.

Regarding lines 5-7, it can be seen in figure 1 and further in figure 5 that every segment 18 in the plurality of [active] segments 18 stores --undo-- information for at least one entity (12 14) of the plurality of entities.

As per claim 14, figure 5 shows a first entity 12 of a plurality of entities associated with a segment 18 (which is part of QDS1 26 - refer to figure 3) of a plurality of segments. Wahl teaches in column 7, lines 47-59, that upon the detection of a pending overflow condition to a first segment 18, an increase in size of the first segment can occur by dynamically allocating an additional amount of storage space (memory) to the first segment. The dynamic allocation occurs as a result of the request from the entity 12 to store more data to the QSD that triggers a pending overflow condition an additional amount of disk space.

As per claim 15, Wahl teaches in column 14, line 34 - column 15, line 12, that a daemon and user-defined throttles are used to determine whether sufficient storage is allocated to a first segment 18 (for storing undo information from the request from the first entity (12 or 14) and if the daemon determines that sufficient storage is not allocated to the first segment 18, then the daemon can dynamically allocate additional storage space (disk storage) to the first segment thereby increasing the size of the first segment 18 (by amount dynamically allocated). Refer to column 7, lines 49-61.

As per claim 16, Wahl teaches in column 14, line 34 - column 15, line 12, that throttles are used by the daemon 24 to determine when an overflow condition of the writelog 18 is pending. Thus when the periodic check of the overflow throttle occurs and more disk space is

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not allocated to the first segment 18, it can be seen that the storage space already allocated for first segment for storing undo information is sufficient.

As per claim 19, if a pending overflow condition exists, Wahl teaches in column 7, lines 47-59, that an additional amount of storage space (disk storage) can be dynamically assigned to the first segment 18 to aid in the overflow condition. It is inherent that a determination be made to guarantee that this dynamically allocated amount not be currently to another segment of plurality of segments since it would be detrimental to the data integrity of the system of Wahl.

As per claim 20, the Examiner is considering the writelog of QDS2 26 of figure 5 to comprises a --second segment-- and can be seen as being associated with entity 12. Wahl states in column 15, lines 1-12, that storage space can be de-allocated (freed) from the segments. Wahl also teaches in column 7, lines 47-59, that additional disk storage can be allocated to a segment with an overflow pending. Thus it is inherent that this disk storage be de-allocated when the segment with the overflow condition no longer requires it. It can therefore be seen that when the additional amount of storage space - that was dynamically allocated to the second segment (write log of QDS2) during an overflow condition - is no longer used by the second segment, that the daemon 24 de-allocate this additional amount of storage not used by the entity 12. Once de-allocated from the second segment, the additional amount of storage space can therefore be allocated to another segment (i.e. a first segment).

As per claim 25, the Examiner is considering the additional amount of additional storage that was dynamically allocated to a first segment 18 (column 7, lines 47-59) to be an extent of contiguous storage since the additional storage is disk memory and disk memory is known to be physically contiguous.

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As per claim 26, Wahl teaches in column 7, lines 47-5, that additional amounts of storage space can be allocated to the plurality of segments 18 in response to receiving undo information from the plurality of entities [causing an overflow condition]. Wahl also teaches de-allocation of storage space from the segments in column 15, lines 1-12 periodically. Since the daemon checks the throttles periodically and the daemon controls the de-allocation of storage space, it can be seen that the de-allocation thereby occurs periodically.

As per claim 55, Wahl teaches in column 7, lines 47-59, that additional segments 18 can be added from the extension pool 18A to be used as segments during overflow conditions.

As per claim 56, Wahl teaches in column 7, like 47-59, that the size of at least one of the plurality of segments 18 (having a pending overflow) can be dynamically adjusted with an amount of disk storage.

As per claim 57, Wahl teaches in column 12, lines 1-11, that storage space of a first segment (whole writelog 18) can have a portion (partition) allocated to a different logical group or entity.

As per claim 60, each entity (12 14) is assigned one or more segments - refer to figure 1 - based on the usage of the segments. If a segment for an entity is about to overflow (large amount of usage), an addition segment can be allocated to the entity from the extension pool 18A. Refer to column 7, lines 47-59.

As per claim 61, the Examiner is considering overuse (overflow) of the segments to be -- statistical information-- that is collected by the daemon 24 when running the throttles. This information is used to determine the amount of usage of the segments and to assign an additional segment 18 or more disk storage dynamically if an overflow is pending.

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As per claim 62, information associated with the usage of the plurality of segments is stored in the user-defined throttles. For example, the threshold to determine an overflow is contained in a throttle (column 14, line 34 - column 15, line 12); this information is --associated- - with the usage of the segments 18 since if this throttle is active, the usage of the segment that is causing the active throttle has a pending overflow condition.

As per claim 63, the Examiner is considering the throttle governing the underflow to also be information regarding usage of the segments since if a segment is being underutilized, it can be de-allocated and placed back in the extension pool 18A as taught in column 15, lines 1-12. The Examiner is further considering the information of the throttles to be stores in an --array of throttles-- wherein the array comprises the throttle values for the underflow and overflow utilizations.

As per claim 64, Wahl teaches in column 14, lines 34-50, that the user defines the values of the throttles. Thus the Examiner is considering the process of periodically storing the information associated with the usage of the segments 18 to occur whenever the user wishes to modify the values of the throttles.

As per claims 67-71, 73, 74, 77-79, 82-84, 88, 89, 91-94, and 97-101, their rejections follow the rejections of claims 3-7, 10, 11, 14-16, 19-21, 25, 26, 54-57, and 60-64, respectively. Further regarding the computer-readable medium, the software program shown in figures 6-9 can be seen as setting throttles for the system of Wahl; these throttles periodically monitor the system of Wahl and perform actions as required. Refer to column 14, lines 34-67.

Allowable Subject Matter

Claims 8, 17, 18, 22-24, 27, 58, 59, 65, 72, 80, 81, 85-87, 90, 95, 96, and 102, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter:

As per claim 8, the prior art of record does not teach nor suggest determining whether de-allocating the first amount leaves an amount allocated to the first segment that is less than a predetermined minimum amount and if so, deletes the first segment.

As per claim 17, the prior art of record does not specifically nor suggest teach allocating an additional amount of storage space to the first segment 18 wherein the amount of storage space is based on the storage already allocated to the first segment 18.

As per claim 18, the prior art of record does not specifically nor suggest allocating an additional amount of storage space to the first segment 18 wherein the amount of storage space is selected from a plurality of predetermined amounts.

As per claim 22, the prior art of record does not specifically teach nor suggest monitoring a number of entities started in each period of time.

As per claim 23, the prior art of record does not specifically teach nor suggest monitoring a maximum number of entities executing concurrently in each period of time.

As per claim 24, the prior art of record does not specifically teach nor suggest monitoring a maximum duration in each period of time among durations of queries termination during the period of time, wherein the queries use at least some of the undo information stored in the storage space.

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Claim 27 is allowable, as mentioned in the previous Office action, dated 2 February 2004. The prior art of record does not specifically teach nor suggest every limitation presented in claim 27.

As per claim 58, the prior art of record does not specifically teach nor suggest determining that the storage space of a partitioned writelog 18 is no longer being used by an entity and upon that determination, de-allocating the storage space.

As per claim 59, the prior art of record does not specifically teach nor suggest allocating the storage space (that is partitioned) to another segment 18.

As per claim 65, the prior art of record does not specifically teach nor suggest determining the usage of each of the plurality of segments and then assigning an entity to one of the plurality of segments bases on the determination.

Claims 72, 80, 81, 85-87, 90, 95, 96, and 102, are objected to as being dependent on objected to claims 8, 17, 18, 22-24, 27, 58, 59, and 65, respectively.

Response to Amendment

As per Applicant's amendment filed 16 September 2004:

(i) the rejection of claims 1-3, 9-17, 20, 25, 26, 28-30, 36-44, 47, 52, and 53 under §102(b) as being anticipated by *Circular Database Log With Dynamic Allocation and Deallocation* have been respectfully withdrawn;

(ii) the rejection of claims 19 and 46 under § 103(a) as being unpatentable over *Circular Database Log With Dynamic Allocation and Deallocation* have been respectfully withdrawn;

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(iii) claims 2-7, 10-16, 19-21, 25, 26, 54-57, 60-64, 67-71, 73-79, 82-84, 88, 89, 91-94, and 97-101 stand rejected under §102(e) as being anticipated by Wahl (U.S. Patent No. 6,324,654);

(iv) claims 8, 17, 18, 22-24, 27, 58, 59, 65, 72, 80, 81, 85-87, 90, 95, 96, and 102 are objected to.

Response to Arguments

Applicant's arguments with respect to claim 2 have been considered but are moot in view of the new ground of rejection. The Examiner agrees that the new limitation of Applicant's amendment on lines 9-10 of claim 2 (regarding --assigning each entity with a segment--) is not taught by IBM since the entities, as stated by the Applicant's amendment (page 24)

...are not really "assigned" to a segment, because each entity writes to the next free page regardless of which file ... the page is in.

Thus the scope of claim 2 has been changed.

Remarks

An updated search by the Examiner resulted in the discovery of the Wahl reference. Because claims 4 were previously stated to have been allowable and now stand rejected, this action is Non-Final.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Burke (U.S. Patent No. 6,185,66) teaches assigning each node of a system to a transaction log. Refer to figure 1.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shane M Thomas whose telephone number is (571) 272-4188. The examiner can normally be reached on M-F 8:30 - 5:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matt M Kim can be reached on (571) 272-4182. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



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